

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN THE APPLICATION OF:

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SERIAL No.: 10/621,154

EXAMINER: V. M. RONSEI

FILED: JULY 13, 2003

GROUP ART UNIT: 1764

TITLE: A Lubricating Composition Having a Hydrocarbyl Phosphite, a Condensation Product of a Fatty Acid with a Polyamine, a Borate Ester, a Borated Dispersant, and an Oil of Lubricating Viscosity

Wickliffe, Ohio

Dated: October 8, 2008

Hon. Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

RESPONSE AND REQUEST FOR RECONSIDERATION

The Applicants wishes to maintain the claims currently on file with the USPTO relating to the present application. Accordingly all reasoned statements below relate to the claims submitted March 26, 2008.

The Examiner has maintained the 35 U.S.C. 103 rejection to claims 1, 2, 7-20 27 and 28 as being unpatentable over Ward (WO00/70001).

The Examiner has considered the declaration submitted on 26 March 2008 by Dr. Patterson. The Examiner has, however, considered the data not persuasive because the comparative data was said to be defective because comparative examples 3 and 4 seemed to fall within the preferred range of 0.9-1.0 with respect to S1/D. It also appeared that the amount of friction modifier could be changed to control the effect of friction and that it would have been obvious to utilise suitable amounts of friction

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modifier as taught by Ward to control the S1/D values. The Applicant respectfully traverses.

The Applicant submits that the comparative data on file is appropriate to demonstrate the unexpected performance as previously described. In addition, the enclosed declaration submitted under Rule 132 by Dr. Richard Vickerman provides a more detailed explanation as to why the data is considered appropriate. The Examiner is respectfully requested to reconsider the comparative data in view of the Vickerman declaration.

The objective at the priority date of the present invention was to solve the problem of shudder (or vibration) in an automatic transmission. As is noted by Dr. Vickerman, shudder involves a high frequency vibration related to the stick-slip friction characteristics of the clutch system. Shudder is felt when driving at a constant speed in top gear when the continuous slip/locking torque converter clutch locks up, stopping all relative motion within the unit. The vibration originates in the torque converter and is transmitted to the entire vehicle via the transmission/engine mounts. Shudder can be caused by improper frictional characteristics of the transmission fluid. To help alleviate this problem, original equipment manufacturers require fluids to meet stringent friction standards. Ford, as outlined in its Mercon transmission fluid specification, requires a 20,000 cycle friction durability test. This test evaluates the frictional characteristics and friction durability over 20,000 clutch engagement cycles of an automatic transmission fluid. The frictional characteristics measured and their respective limits include:

- 1) Low Speed Dynamic Torque (S1) (a.k.a. static torque or quasi-static torque), which is defined as the highest value for torque obtained within the last 50 milliseconds (ms) of the engagement event.
- 2) Midpoint Dynamic Torque (D), which is defined as the mean of torques obtained during the 50 ms interval centrally located about the 1800 RPM speed.
- 3) S1/D ratio, which is required to fall within the range of 0.85 to 1.00 between 200 and 20,000 cycles of operation.
- 4) Static Breakaway Torque, which is defined as the torque measured 0.25 seconds after the beginning of the static engagement. This measurement must fall within the range of 0.090 and 0.140 between 400 and 20,000 cycles of operation.

In order to overcome the problem of shudder, studies performed by the inventors of the present invention led to the presently claimed invention. This invention has unexpectedly better performance at solving the problem highlighted than does the formulation of Ward. This is demonstrated by the data presented in the Patterson declaration of March 26, 2008.

However, in addition to that declaration, the declaration from Dr. Vickerman further explains the importance of the data and why the comparative data is appropriate and demonstrates how the present invention is unobvious over Ward.

Of the formulations tested and presented in the March 26, 2008 Patterson declaration, only the formulation containing the fatty acid/polyamine friction modifier showed acceptable performance. Its S1/D ratio remained in the range of 0.924 to 0.978 and the static coefficient remained between about 0.118 and 0.141. The closest other material, in terms of performance, was the oleyl amide of Comparative Example 3. But that material exhibited several measurements of S1/D in excess of 1.0, indicating that torque increases at the end of the clutch engagement which can potentially cause shudder. Comparative Example 3 also showed poor green (break in) friction performance (values in excess of 1.0 continuing through 400-600 cycles). The most similar material in terms of structure, the imidazoline of Comparative Example 1, performed very poorly, exhibiting both a very low S1/D and static coefficient of friction.

Accordingly, only the fatty acid/amine condensate as presently claimed provides a suitable coefficient of friction and anti-shudder performance at both beginning and end of the test. The data presented therefore demonstrates that comparative example 3 (relating to Ward) does not attain the performance that is required by the test. Accordingly, a person skilled in the art, starting from Ward, would not pass the performance criteria required to meet the test specification.

In view of teaching and disclosures of Ward, it would therefore not be possible to pass the test specification described in the declaration and generally defined in the background section of the Applicant's specification.

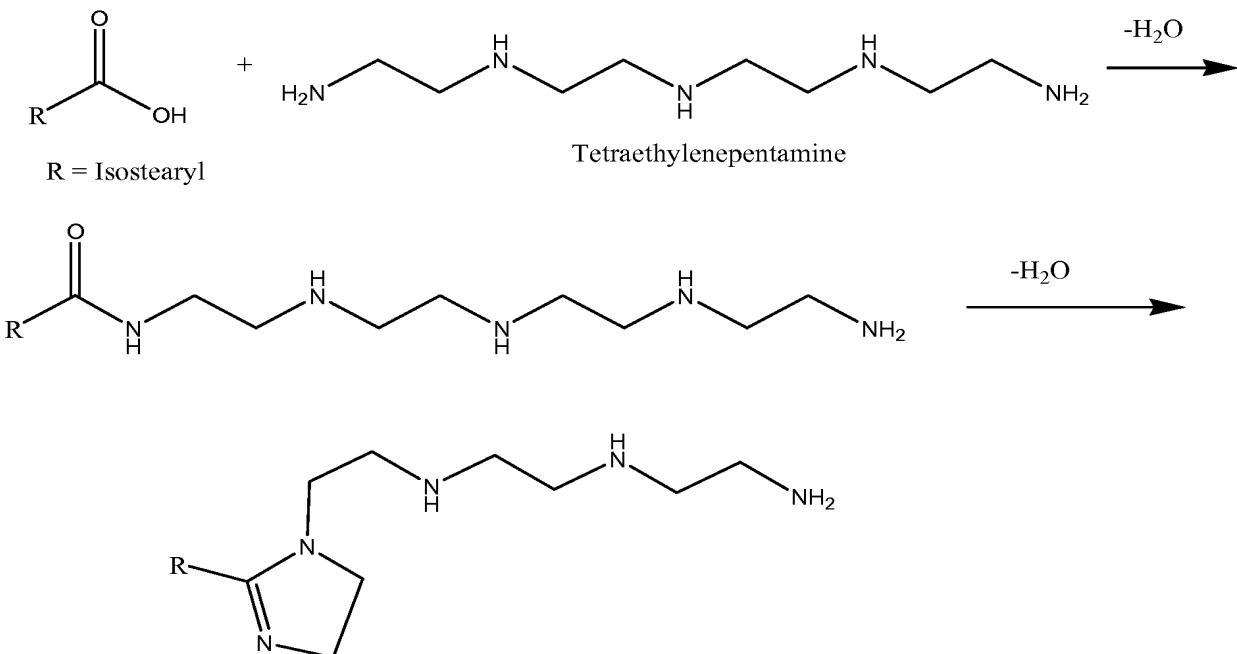
In contrast, the presently claimed invention does unexpectedly provide performance that satisfies the test specification. In order to pass the test, the present inventors had to purposely select the appropriate combination of additives. This combination is currently claimed. The presently claimed combination of additives is not taught, disclosed or suggested by Ward.

In view of the reasoned statements above and all of the evidence currently and previously submitted, the Applicant submits that the present invention meets all of the requirements of U.S.C. 103, and is therefore unobvious over Ward.

The Examiner further believed that the data presented was not reasonably commensurate in scope with the claims, given that the data was only for isostearic acid and tetraethylenepentamine (which was supposedly not a member of formula III, hydrocarbyl imidazoline) and the claims are drawn to both a hydrocarbyl imidazoline and a hydrocarbyl amide. The Applicant respectfully requests the Examiner to reconsider in view of the Vickerman declaration.

Dr. Vickerman explains that the condensation product of isostearic acid + tetraethylenepentamine is indeed a member of formula III, hydrocarbyl imidazolines.

The reaction mechanism resulting in the condensation product as presently claimed forms both an amide and imidazoline. The mechanism is shown as



That is, the condensation product may be either the amide, as shown in the middle line, or the imidazoline, as shown in the last line, or a mixture of the two, depending on the severity of the conditions and extent of water removal.

Accordingly, it is submitted that the data presented is reasonably commensurate in scope with the claims for the reasons set forth above. The Examiner is requested to withdraw the rejection relating to the claims not being reasonably commensurate in scope with the experimental data provided.

In view of the remarks above, the Applicant submits that the rejection in view of Ward and Farng (US 5,006,270) to claims 12 and 13 is obviated because both claims are dependent on claim 1. However, if the remarks are deemed insufficient to convince the Examiner of patentability of the present invention the following remarks are submitted as to why claims 12 and 13 are patentable over Ward and Farng.

The Examiner acknowledges that Ward does not teach the use of a borate ester like those described in dependent claims 12 and 13 of the present invention. However, the examiner noted that Ward is open to the use of antioxidants.

The Examiner considered Farng to disclose a lubricant composition that teaches borate esters such as tributyl borate (see column 3, lines 53 to 65). Such materials allegedly have excellent multifunctional/antioxidant activity (see column 1, lines 16 to 19). The Applicant respectfully requests the Examiner to consider the context of the tributyl borate as described by Farng. Column 3, line 53 to 65 states:

The borated derivatives are conveniently produced by the reaction of the selected mixture of compounds with, for example, boric acid, in the presence of a suitable solvent or solvents at temperatures ranging from about 80 °C. to about 280 °C. Specific reactor conditions and molar equivalents vary with the various reactants and can be readily determined by one of ordinary skill in the art. Besides direct treatment with boric acid other boration procedures several of which are well known in the art can be used, for example, transesterification with a trialkyl borate such as tributyl borate. Accordingly, metaborates, trialkyl borates or any other suitable boronating agent may be employed.

In this quoted text, the reference to "borated derivatives" refers to the materials described by Farng as the invention material i.e., mixed hydroxylaryl-hydroxyester borates. The tributyl borate explicitly described in lines 60 to 63 are not "the borated derivatives" but rather reactants for boration procedures. The tributyl ester is merely being used as a reactant to form mixed hydroxylaryl-hydroxyester borates.

The declaration by Vickerman confirms that Farng uses tributyl borate as a reactant to make mixed hydroxylaryl-hydroxyester borates which are the claimed group of compounds in that reference. Alkyl borates, like tributyl borate, do not function as antioxidants.

In contrast dependent claims 12 and 13 of the present invention are directly adding the borate esters such as tributyl borate to the lubricating composition. The present invention does not make borate ester derivatives as described by Farng before adding them into the presently claimed composition of claims 12 and 13. Accordingly, the Applicant submits that, in view of the difference highlighted, the combination of Ward and Farng would not result in the subject matter of dependent claims 12 and 13. The Examiner is respectfully requested to withdraw the 35 U.S.C. 103(a) rejection over Ward and Farng.

For the foregoing reasons, it is submitted that all claims are novel and unobvious. Accordingly, an early and favorable reconsideration of the rejections made in the prior office actions is respectfully requested. It is believed that no additional fees are due in connection with this submission. However, any required fees or underpayment or overpayment of fees should be charged (or credited) to Deposit Account 12-2275 (The Lubrizol Corporation).

Respectfully submitted,

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